

EKPC did not control the process described above and therefore cannot explain why the process took so long to complete. However, it is EKPC's fervent belief that EKPC did not unnecessarily contribute to the length of the process.



EAST KENTUCKY POWER COOPERATIVE, INC.

PSC CASE NO. 2005-00458

INFORMATION REQUEST RESPONSE

COMMISSION STAFF'S 1ST DATA REQUEST DATED 1-20-06

ITEM 20

RESPONSIBLE PARTY: DARRIN ADAMS

**REQUEST:** Describe when the danger of a blackout in the Rowan County area, as described by East Kentucky in Case No. 2005-00089, was first realized and, in accordance with the transmission power flow studies, thermal overload studies, and short circuit studies, describe the various scenarios under which such an event could occur.

**RESPONSE:** The possibility of potential cascading outages was first apparent in the operational study conducted to assess potential issues during the period both before and after the completion of the E.A. Gilbert Unit. This study was conducted by Stanley Consultants on behalf of EKPC, and is documented as *E.A. Gilbert Unit 3 - Analysis of Transmission Operational Issues*, dated May 21, 2004. In that study, the Goddard-Rodburn 138 kV loadings were shown to be as high as 136% of the emergency rating. At this level, there is a strong possibility of the facility tripping out of service. This would result in heavy loadings on other area facilities, which could result in cascading outages and eventual widespread service interruptions.

This possibility for cascading outages was further explored in EKPC's 2005 Summer Assessment performed for ECAR. The results of this study were documented in the report titled *East Kentucky Power Cooperative Assessment of Expected System*

*Performance – 2005 Summer Conditions*, dated May 4, 2005. This study indicated that several potential scenarios impact the Goddard-Rodburn 138 kV line loading such that potential cascading outages could occur.

In addition to these studies, actual system events occurred in early September 2005 that resulted in severe system conditions. Those events began with a maintenance outage of LGEE's Goddard-Rodburn 138 kV line that resulted in an overload of the Avon-Boonesboro North Tap 138 kV line section. After-the-fact analysis of those events indicated that a trip of the Avon-Boonesboro North 138 kV line could have resulted in cascading outages and significant loss of service to customers in the northeastern section of Kentucky. This analysis also indicated that had the Cranston-Rowan 138 kV line been in-service, the possibility for cascading outages would not have existed.

The conditions that have been identified in the studies referenced above that can result in tripping the Goddard-Rodburn 138 kV line, and which could lead to cascading outages are as follows:

**System Condition Scenarios Without Transfers That Could Result in Cascading Outages:**

- No transmission outages with either normal system dispatch or with any one of several generating unit outages
- Fawkes-Clark County 138 kV out with normal system dispatch or with any one of several generating unit outages
- Spurlock-Avon 345 kV out with normal system dispatch or with any one of several generating unit outages

- Avon-Boonesboro North Tap 138 kV out with normal system dispatch or with any one of several generating unit outages
- Avon-Boonesboro North-Dale 138 kV out with normal system dispatch or with any one of several generating unit outages
- Goddard 138-69 kV out with normal system dispatch or with any one of several generating unit outages
- Avon-Boonesboro North-Dale 138 kV out and Fawkes-Clark County 138 kV out simultaneously
- Goddard-Rodburn 138 kV out and Fawkes-Clark County 138 kV out simultaneously
- Goddard-Rodburn 138 kV out and Avon-Boonesboro North-Dale 138 kV out simultaneously

**System Condition Scenarios Without Transfers and with JK Smith CTs Off Line  
(At Peak and Shoulder Peak Load Levels) That Could Result in Cascading Outages:**

- No transmission outages
- Big Sandy-Bussyville 138 kV out
- Ghent-West Lexington-Brown 345 kV out
- Spurlock-Avon 345 kV out
- Avon-Boonesboro North-Dale 138 kV out
- Goddard 138-69 kV out

**System Condition Scenarios With a 4000 MW North-South Incremental Transfer That Could Result in Cascading Outages:**

- All of the same problems as listed previously for other system conditions still exist at more severe levels
- Kenton-Goddard-Rodburn 138 kV out with either normal system dispatch or for any one of several generating unit outages
- Goddard-Rodburn 138 kV out with either normal system dispatch or for any one of several generating unit outages
- 73 separate double contingencies have been identified as resulting in overloads of the Goddard-Rodburn 138 kV line
- Kenton-Goddard-Rodburn 138 kV out and Spencer Road-Clark County 138 kV out simultaneously
- Kenton-Goddard-Rodburn 138 kV out and Fawkes-Clark County 138 kV out simultaneously
- Kenton-Goddard-Rodburn 138 kV out and Avon-Boonesboro North-Dale 138 kV out simultaneously
- Goddard-Rodburn 138 kV out and Spencer Road-Farmers Tap 138 kV out simultaneously
- Goddard-Rodburn 138 kV out and Spencer Road-Clark County 138 kV out simultaneously
- Goddard 138 kV EKPC-LGEE interconnection out and Kenton-Wedonia 138 kV out simultaneously

This is by no means an exhaustive list. Many of these studies used screening techniques to reduce the results down to the most severe cases. Therefore, there are likely to be many more scenarios that could potentially cause overloads or undervoltages severe enough to potentially result in cascading outages and/or customer interruptions.



EAST KENTUCKY POWER COOPERATIVE, INC.

PSC CASE NO. 2005-00458

INFORMATION REQUEST RESPONSE

COMMISSION STAFF'S 1ST DATA REQUEST DATED 1-20-06

ITEM 21

RESPONSIBLE PARTY: MARK BREWER

**REQUEST:** Refer to page 7 of the Warner Testimony. Provide all correspondence between East Kentucky and the USFS beginning with East Kentucky's informing the USFS of its need to cross the Forest and continuing through the issuance of the EA on January 28, 2005.

**RESPONSE:** See **Data Response Item 21 Exhibit A** attached hereto.



EAST KENTUCKY POWER COOPERATIVE, INC.

PSC CASE NO. 2005-00458

INFORMATION REQUEST RESPONSE

COMMISSION STAFF'S 1ST DATA REQUEST DATED 1-20-06

ITEM 22

RESPONSIBLE PARTY: MARK BREWER AND MARY JANE WARNER

**REQUEST:** Who owns the pipelines that enter and exit the Cranston Compressor Station? Describe the number of pipes, the diameter of the pipes, and the pressure under which they operate.

**RESPONSE:** According to our records there are 6 high pressure transmission gas pipelines along North Triplett Creek in the Cranston area. Three belonging to El Paso Gas Pipeline and three to Columbia Gulf. We do not know if the Columbia Gulf pipelines enter and exit into the Cranston Compressor station. The diameter and pressures at which they operate were not needed and are not known by EKPC.



EAST KENTUCKY POWER COOPERATIVE, INC.

PSC CASE NO. 2005-00458

INFORMATION REQUEST RESPONSE

COMMISSION STAFF'S 1ST DATA REQUEST DATED 1-20-06

ITEM 23

RESPONSIBLE PARTY: MARK BREWER

**REQUEST:** Do the pipeline companies have written guidelines for paralleling (collocating) in their right-of-way with electric lines? Have you had any correspondence with the pipeline companies concerning this matter? If yes, provide copies.

**RESPONSE:** EKPC has no written correspondence with the gas companies. However, there was a conversation (sometime in 2002) with Bill Mei, an engineer with El Paso Gas, who advised EKPC that "a transmission line that runs parallel to a gas line should be at least ¼ mile away to be out of the area of influence." EKPC was advised that if EKPC locates electric transmission lines within this area of influence then EKPC risks placing workers and the public in danger. EKPC was further advised that there are also cathodic reaction issues that would accelerate the decay of their gas lines that would need to be addressed as well. Mr. Mei also advised that El Paso Gas would have no objection to EKPC crossing their line provided we crossed at or near perpendicular to their line and placed no structures or guys on their easement(s).



EAST KENTUCKY POWER COOPERATIVE, INC.

PSC CASE NO. 2005-00458

INFORMATION REQUEST RESPONSE

COMMISSION STAFF'S 1ST DATA REQUEST DATED 1-20-06

ITEM 24

RESPONSIBLE PARTY: MARK BREWER

**REQUEST:** At some point you have to cross the pipelines to reach your Cranston Electric Substation. Have you reviewed the crossing point with the pipeline companies involved? Provide any correspondence, and describe any discussions related to the safety of placing an electric transmission line in close proximity to a natural gas compressor station.

**RESPONSE:** Typically gas companies have no objection to transmission lines crossing their gas lines provided they cross at or near perpendicular to their lines and have no structures or guys within their easement area. Some companies conduct aerial patrols of their lines routinely for maintenance purposes and may request that the utility install aerial markers to the top wire for aerial visibility. Attached as **Data Response Item 24 Exhibit A** are copies of correspondence with El Paso Gas about obtaining an easement across their property and their associated concerns.

EKPC is not aware of any specific safety issues in placing a transmission line near a gas compressor station except for those associated with paralleling the gas lines going into these stations. When electric transmission lines parallel gas lines a capacitive

coupling can be established. This coupling can induce both a voltage and current on the parallel gas line that is potentially dangerous to gas line personnel and the surrounding community. A cathodic reaction can also occur on the parallel gas line, which reaction causes the gas line to become a sacrificial anode for the transmission line resulting in the accelerated decay of their facilities. Unless resolved, such situations will result in serious safety issues. These safety issues will not be a factor for the EKPC proposed route.



EAST KENTUCKY POWER COOPERATIVE, INC.

PSC CASE NO. 2005-00458

INFORMATION REQUEST RESPONSE

COMMISSION STAFF'S 1ST DATA REQUEST DATED 1-20-06

ITEM 25

RESPONSIBLE PARTY: MARK BREWER

**REQUEST:** Have the gas transmission companies been notified regarding the crossing of their right of way? Do they need notification legally?

**RESPONSE:** Yes they have been contacted. It is EKPC's opinion that as long as EKPC does not interfere with the safe and reliable operation of their gas line or pose a threat to public safety that we do not legally have to contact them. However, as a matter of professional courtesy, we make it a practice to contact them.



EAST KENTUCKY POWER COOPERATIVE, INC.

PSC CASE NO. 2005-00458

INFORMATION REQUEST RESPONSE

COMMISSION STAFF'S 1ST DATA REQUEST DATED 1-20-06

ITEM 26

RESPONSIBLE PARTY: WILLIAM A. BOSTA

**REQUEST:** Who would actually pay for the re-dispatch costs (\$58 million to \$194 million annually as estimated in the testimony of Darrin Adams) associated with the north-to-south transfer of 4,000 MW across Kentucky?

**RESPONSE:** As referenced in EKPC's Application, it is the absence of the Cranston-Rowan 138KV line that causes an overloading on several different transmission lines in the area, particularly KU's Goddard-Rodburn 138KV transmission line, regardless of the level of north-south power transfers. As a result of these overloadings and Transmission Loading Relief (TLR) procedures, EKPC will typically be required to reduce generation at Spurlock and increase generation at its Smith Combustion Turbine units and/or purchase power to replace the foregone generation at Spurlock. The increased fuel and/or purchased power cost associated with the replacement power would be subject to recovery from Member System Cooperatives through EKPC's Fuel Adjustment Clause (FAC), and would then be recovered from retail customers through the Member Systems' FAC factor.



EAST KENTUCKY POWER COOPERATIVE, INC.

PSC CASE NO. 2005-00458

INFORMATION REQUEST RESPONSE

COMMISSION STAFF'S 1ST DATA REQUEST DATED 1-20-06

ITEM 27

RESPONSIBLE PARTY: WILLIAM A. BOSTA

**REQUEST:** In his testimony, William A. Bosta assumes that East Kentucky's customers would pay the entire cost of re-dispatch even though the 4,000 MW transfer is for the benefit of companies other than East Kentucky. What evidence supports the assumption that East Kentucky's customers will bear the entire cost?

**RESPONSE:** As explained in the testimony of Mr. Adams (EKPC Exhibit 16), it is the absence of the Cranston-Rowan 138KV line that will cause the overloading on KU's Goddard-Rodburn 138KV line and trigger the need for re-dispatch. When subject to a TLR, EKPC is required to comply with instructions from the Security Coordinator to relieve congestion and will typically re-dispatch its generating units to comply. At present, even if the source or specific cause of the overloading could be identified, there is no mechanism available for EKPC to be compensated for its required re-dispatch through the energy markets. As a result, EKPC's Member System retail customers will be forced to absorb the additional cost associated with re-dispatch through application of the FAC until the Cranston-Rowan line is completed.



EAST KENTUCKY POWER COOPERATIVE, INC.

PSC CASE NO. 2005-00458

INFORMATION REQUEST RESPONSE

COMMISSION STAFF'S 1ST DATA REQUEST DATED 1-20-06

ITEM 28

RESPONSIBLE PARTY: MARK BREWER

**REQUEST:** When was the re-conductoring of the Avon-Boonesboro North Tap 138 kV line completed? If it has not been completed, state the expected completion date.

**RESPONSE:** This re-conductoring was completed on November 11, 2005.



EAST KENTUCKY POWER COOPERATIVE, INC.

PSC CASE NO. 2005-00458

INFORMATION REQUEST RESPONSE

COMMISSION STAFF'S 1ST DATA REQUEST DATED 1-20-06

ITEM 29

RESPONSIBLE PARTY: DARRIN ADAMS

**REQUEST:** When does East Kentucky expect to increase the capacity of the Avon 345-138 kV transformer beyond its 434 MVA summer rating?

**RESPONSE:** EKPC does not have any specific projects scheduled to increase the capacity of the Avon 345-138 kV transformer. However, EKPC is in the process of implementing a Dynamic Thermal Circuit Rating (DTCR) program developed by the Electric Power Research Institute (EPRI). The DTCR is designed to maximize the amount of power that can flow through the 345/138kV power transformer at the Avon Substation. Based on actual weather conditions and real-time operating parameters of the transformer, the DTCR system dynamically rates the transformer's capabilities.

Given the transmission constraints facing EKPC, this tool may allow EKPC dispatchers to allow more power flow through this transformer; thus, allowing for a more economical dispatch of our generating units.

The DTCR program will be implemented as an interim measure to more accurately identify the transformer limit using actual conditions. EKPC has identified

transmission system additions to be made by June of 2007 that will greatly reduce the power flows on the Avon transformer. These transmission system additions are:

- Construction of the North Clark 345 kV switching substation, with the existing Spurlock-Avon 345 kV line terminated in this new station
- Rebuild of 18 miles of existing 69 kV transmission line to a 345 kV transmission line with 69 kV underbuild from North Clark to the J.K. Smith Substation
- Addition of two 345-138 kV, 450 MVA autotransformers at the J.K. Smith Substation

These additions will provide a parallel path for power flows that will substantially reduce the flow through the Avon transformer. This does not increase the capacity of the Avon transformer, but does add 345-138 kV transformer capacity in the area.



EAST KENTUCKY POWER COOPERATIVE, INC.

PSC CASE NO. 2005-00458

INFORMATION REQUEST RESPONSE

COMMISSION STAFF'S 1ST DATA REQUEST DATED 1-20-06

ITEM 30

RESPONSIBLE PARTY: DARRIN ADAMS

**REQUEST:** Identify the limiting facilities, together with the percentage overload and the outaged facility, that would necessitate re-dispatching Smith Station and Spurlock Station, after the Avon-Boonesboro North Tap upgrade is completed, for the following conditions in each of the summers of 2006, 2007, and 2008:

- a. Normal conditions without north-south transfers.
- b. Normal conditions with north-south transfers.
- c. Single contingency outage without north-south transfers.
- d. Single contingency outage with north-south transfers.
- e. Single contingency plus unit outage without north-south transfers.
- f. Single contingency plus unit outage with north-south transfers.

**RESPONSE:** The limiting facilities for the conditions described above were identified through power flow analysis using EKPC's latest models. A north-south transfer level of 4000 MW was simulated to develop the responses to b), d), and f). Power flows were performed both with and without the proposed Cranston-Rowan County 138 kV Project to illustrate the impact of the line addition. Only the worst-case overloading is shown for

each limiting facility. In many cases, a limiting facility may overload for several different contingencies.

**a) Normal conditions without north-south transfers**

**2006 Summer**

Without Cranston-Rowan County Project:

| <b>Limiting Facility</b>  | <b>Company</b> | <b>Percent Overload</b> | <b>Worst-Case Contingency</b> |
|---------------------------|----------------|-------------------------|-------------------------------|
| Goddard KU-Rodburn 138 kV | LGEE           | 103.9%                  | None                          |

With Cranston-Rowan County Project:

| <b>Limiting Facility</b> | <b>Company</b> | <b>Percent Overload</b> | <b>Worst-Case Contingency</b> |
|--------------------------|----------------|-------------------------|-------------------------------|
| None                     |                |                         |                               |

**2007 Summer**

Without Cranston-Rowan County Project:

| <b>Limiting Facility</b> | <b>Company</b> | <b>Percent Overload</b> | <b>Worst-Case Contingency</b> |
|--------------------------|----------------|-------------------------|-------------------------------|
| None                     |                |                         |                               |

With Cranston-Rowan County Project:

| <b>Limiting Facility</b> | <b>Company</b> | <b>Percent Overload</b> | <b>Worst-Case Contingency</b> |
|--------------------------|----------------|-------------------------|-------------------------------|
| None                     |                |                         |                               |

**2008 Summer**

Without Cranston-Rowan County Project:

| <b>Limiting Facility</b>  | <b>Company</b> | <b>Percent Overload</b> | <b>Worst-Case Contingency</b> |
|---------------------------|----------------|-------------------------|-------------------------------|
| Goddard KU-Rodburn 138 kV | LGEE           | 103.6%                  | None                          |

With Cranston-Rowan County Project:

| <b>Limiting Facility</b> | <b>Company</b> | <b>Percent Overload</b> | <b>Worst-Case Contingency</b> |
|--------------------------|----------------|-------------------------|-------------------------------|
| None                     |                |                         |                               |

**b) Normal conditions with a 4000 MW incremental north-south transfer**

**2006 Summer**

Without Cranston-Rowan County Project:

| <b>Limiting Facility</b>  | <b>Company</b> | <b>Percent Overload</b> | <b>Worst-Case Contingency</b> |
|---------------------------|----------------|-------------------------|-------------------------------|
| Goddard KU-Rodburn 138 kV | LGEE           | 114.8%                  | None                          |
| Avon 345-138 kV           | EKPC           | 110.0%                  | None                          |

With Cranston-Rowan County Project:

| <b>Limiting Facility</b> | <b>Company</b> | <b>Percent Overload</b> | <b>Worst-Case Contingency</b> |
|--------------------------|----------------|-------------------------|-------------------------------|
| Avon 345-138 kV          | EKPC           | 109.0%                  | None                          |

**2007 Summer**

Without Cranston-Rowan County Project:

| <b>Limiting Facility</b>  | <b>Company</b> | <b>Percent Overload</b> | <b>Worst-Case Contingency</b> |
|---------------------------|----------------|-------------------------|-------------------------------|
| Goddard KU-Rodburn 138 kV | LGEE           | 105.7%                  | None                          |

With Cranston-Rowan County Project:

| <b>Limiting Facility</b> | <b>Company</b> | <b>Percent Overload</b> | <b>Worst-Case Contingency</b> |
|--------------------------|----------------|-------------------------|-------------------------------|
| None                     |                |                         |                               |

**2008 Summer**

Without Cranston-Rowan County Project:

| <b>Limiting Facility</b>  | <b>Company</b> | <b>Percent Overload</b> | <b>Worst-Case Contingency</b> |
|---------------------------|----------------|-------------------------|-------------------------------|
| Goddard KU-Rodburn 138 kV | LGEE           | 110.0%                  | None                          |

With Cranston-Rowan County Project:

| <b>Limiting Facility</b> | <b>Company</b> | <b>Percent Overload</b> | <b>Worst-Case Contingency</b> |
|--------------------------|----------------|-------------------------|-------------------------------|
| None                     |                |                         |                               |

**c) Single contingency outage without north-south transfers**

**2006 Summer**

Without Cranston-Rowan County Project:

| <b>Limiting Facility</b>  | <b>Company</b> | <b>Percent Overload</b> | <b>Worst-Case Contingency</b> |
|---------------------------|----------------|-------------------------|-------------------------------|
| Goddard KU-Rodburn 138 kV | LGEE           | 103.1%                  | Goddard 138-69 kV             |

With Cranston-Rowan County Project:

| <b>Limiting Facility</b>     | <b>Company</b> | <b>Percent Overload</b> | <b>Worst-Case Contingency</b> |
|------------------------------|----------------|-------------------------|-------------------------------|
| Morehead East-Morehead 69 kV | LGEE           | 100.9%                  | Rodburn-Sharkey Tap 138 kV    |

**2007 Summer**

Without Cranston-Rowan County Project:

| <b>Limiting Facility</b>  | <b>Company</b> | <b>Percent Overload</b> | <b>Worst-Case Contingency</b> |
|---------------------------|----------------|-------------------------|-------------------------------|
| Goddard KU-Rodburn 138 kV | LGEE           | 100.1%                  | Spurlock-North Clark 345 kV   |

With Cranston-Rowan County Project:

| <b>Limiting Facility</b> | <b>Company</b> | <b>Percent Overload</b> | <b>Worst-Case Contingency</b> |
|--------------------------|----------------|-------------------------|-------------------------------|
| None                     |                |                         |                               |

**2008 Summer**

Without Cranston-Rowan County Project:

| <b>Limiting Facility</b>    | <b>Company</b> | <b>Percent Overload</b> | <b>Worst-Case Contingency</b> |
|-----------------------------|----------------|-------------------------|-------------------------------|
| Goddard KU-Rodburn 138 kV   | LGEE           | 106.6%                  | Spurlock-North Clark 345 kV   |
| Goddard-Plummers Jct. 69 kV | EKPC           | 101.3%                  | Goddard KU-Rodburn 138 kV     |

With Cranston-Rowan County Project:

| <b>Limiting Facility</b> | <b>Company</b> | <b>Percent Overload</b> | <b>Worst-Case Contingency</b> |
|--------------------------|----------------|-------------------------|-------------------------------|
| None                     |                |                         |                               |

**d) Single contingency outage with a 4000 MW incremental north-south transfer**

**2006 Summer**

Without Cranston-Rowan County Project:

| <b>Limiting Facility</b>     | <b>Company</b> | <b>Percent Overload</b> | <b>Worst-Case Contingency</b> |
|------------------------------|----------------|-------------------------|-------------------------------|
| Morehead East-Morehead 69 kV | LGEE           | 133.4%                  | Rodburn-Sharkey Tap 138 kV    |
| Goddard KU-Rodburn 138 kV    | LGEE           | 111.8%                  | Spurlock-Avon 345 kV          |
| Hitchins-Leon 69 kV          | AEP            | 111.5%                  | Goddard KU-Rodburn 138 kV     |
| Goddard-Plummers Jct. 69 kV  | EKPC           | 106.5%                  | Goddard KU-Rodburn 138 kV     |

With Cranston-Rowan County Project:

| <b>Limiting Facility</b>     | <b>Company</b> | <b>Percent Overload</b> | <b>Worst-Case Contingency</b> |
|------------------------------|----------------|-------------------------|-------------------------------|
| Morehead East-Morehead 69 kV | LGEE           | 145.3%                  | Rodburn-Sharkey Tap 138 kV    |
| Morehead-Morehead West 69 kV | LGEE           | 102.9%                  | Rodburn-Sharkey Tap 138 kV    |
| Hitchins-Leon 69 kV          | AEP            | 102.7%                  | Goddard KU-Rodburn 138 kV     |

**2007 Summer**

Without Cranston-Rowan County Project:

| <b>Limiting Facility</b>    | <b>Company</b> | <b>Percent Overload</b> | <b>Worst-Case Contingency</b> |
|-----------------------------|----------------|-------------------------|-------------------------------|
| Hitchins-Leon 69 kV         | AEP            | 113.5%                  | Argentum-Low Gap Tap 69 kV    |
| Goddard KU-Rodburn 138 kV   | LGEE           | 111.8%                  | Spurlock-North Clark 345 kV   |
| Goddard-Plummers Jct. 69 kV | EKPC           | 101.2%                  | Goddard KU-Rodburn 138 kV     |

With Cranston-Rowan County Project:

| <b>Limiting Facility</b>     | <b>Company</b> | <b>Percent Overload</b> | <b>Worst-Case Contingency</b> |
|------------------------------|----------------|-------------------------|-------------------------------|
| Morehead East-Morehead 69 kV | LGEE           | 107.8%                  | Rodburn-Sharkey Tap 138 kV    |
| Hitchins-Leon 69 kV          | AEP            | 104.8%                  | Argentum-Low Gap Tap 69 kV    |

**2008 Summer**

Without Cranston-Rowan County Project:

| Limiting Facility              | Company | Percent Overload | Worst-Case Contingency      |
|--------------------------------|---------|------------------|-----------------------------|
| Goddard KU-Rodburn 138 kV      | LGEE    | 116.6%           | Spurlock-North Clark 345 kV |
| Hitchins-Leon 69 kV            | AEP     | 112.5%           | Argentum-Low Gap Tap 69 kV  |
| Goddard-Plummers Jct. 69 kV    | EKPC    | 105.8%           | Goddard KU-Rodburn 138 kV   |
| Dale-Three Forks Jct. 138 kV   | EKPC    | 103.3%           | JK Smith-Union City 138 kV  |
| Morehead East-Morehead 69 kV   | LGEE    | 102.5%           | Rodburn-Sharkey Tap 138 kV  |
| Three Forks Jct.-Fawkes 138 kV | EKPC    | 100.2%           | JK Smith-Union City 138 kV  |

With Cranston-Rowan County Project:

| Limiting Facility            | Company | Percent Overload | Worst-Case Contingency     |
|------------------------------|---------|------------------|----------------------------|
| Morehead East-Morehead 69 kV | LGEE    | 114.7%           | Rodburn-Sharkey Tap 138 kV |
| Hitchins-Leon 69 kV          | AEP     | 102.9%           | Argentum-Low Gap Tap 69 kV |
| Dale-Three Forks Jct. 138 kV | EKPC    | 102.4%           | JK Smith-Union City 138 kV |

**e) Single contingency plus unit outage without north-south transfers**

**2006 Summer**

Without Cranston-Rowan County Project:

| Limiting Facility            | Company | Percent Overload | Worst-Case Contingency     | Unit Outage |
|------------------------------|---------|------------------|----------------------------|-------------|
| Morehead East-Morehead 69 kV | LGEE    | 110.0%           | Rodburn-Sharkey Tap 138 kV | Brown #3    |
| Goddard KU-Rodburn 138 kV    | LGEE    | 104.9%           | Spurlock-Avon 345 kV       | Brown #3    |
| Goddard-Plummers Jct. 69 kV  | EKPC    | 103.3%           | Goddard KU-Rodburn 138 kV  | Brown #3    |
| Hitchins-Leon 69 kV          | AEP     | 100.6%           | Goddard KU-Rodburn 138 kV  | Brown #3    |

With Cranston-Rowan County Project:

| <b>Limiting Facility</b>         | <b>Company</b> | <b>Percent Overload</b> | <b>Worst-Case Contingency</b> | <b>Unit Outage</b> |
|----------------------------------|----------------|-------------------------|-------------------------------|--------------------|
| Morehead East-<br>Morehead 69 kV | LGEE           | 121.6%                  | Rodburn-Sharkey<br>Tap 138 kV | Brown #3           |

2007 Summer

Without Cranston-Rowan County Project:

| <b>Limiting Facility</b>      | <b>Company</b> | <b>Percent Overload</b> | <b>Worst-Case Contingency</b>  | <b>Unit Outage</b> |
|-------------------------------|----------------|-------------------------|--------------------------------|--------------------|
| Goddard KU-<br>Rodburn 138 kV | LGEE           | 105.8%                  | Spurlock-North Clark<br>345 kV | Brown #3           |
| Hitchins-Leon 69 kV           | AEP            | 101.7%                  | Goddard KU-<br>Rodburn 138 kV  | Brown #3           |

With Cranston-Rowan County Project:

| <b>Limiting Facility</b> | <b>Company</b> | <b>Percent Overload</b> | <b>Worst-Case Contingency</b> | <b>Unit Outage</b> |
|--------------------------|----------------|-------------------------|-------------------------------|--------------------|
| None                     |                |                         |                               |                    |

2008 Summer

Without Cranston-Rowan County Project:

| <b>Limiting Facility</b>        | <b>Company</b> | <b>Percent Overload</b> | <b>Worst-Case Contingency</b>  | <b>Unit Outage</b> |
|---------------------------------|----------------|-------------------------|--------------------------------|--------------------|
| Goddard KU-<br>Rodburn 138 kV   | LGEE           | 111.7%                  | Spurlock-North Clark<br>345 kV | Brown #3           |
| Hitchins-Leon 69 kV             | AEP            | 105.8%                  | Goddard KU-<br>Rodburn 138 kV  | Brown #3           |
| Goddard-Plummers<br>Jct. 69 kV  | EKPC           | 103.9%                  | Goddard KU-<br>Rodburn 138 kV  | Brown #3           |
| Dale-Three Forks Jct.<br>138 kV | EKPC           | 100.9%                  | JK Smith-Union City<br>138 kV  | Brown #3           |

With Cranston-Rowan County Project:

| <b>Limiting Facility</b>         | <b>Company</b> | <b>Percent Overload</b> | <b>Worst-Case Contingency</b> | <b>Unit Outage</b> |
|----------------------------------|----------------|-------------------------|-------------------------------|--------------------|
| Morehead East-<br>Morehead 69 kV | LGEE           | 102.5%                  | Rodburn-Sharkey<br>Tap 138 kV | Brown #3           |

**f) Single contingency plus unit outage with a 4000 MW incremental north-south transfer**

**2006 Summer**

Without Cranston-Rowan County Project:

| <b>Limiting Facility</b>         | <b>Company</b> | <b>Percent Overload</b> | <b>Worst-Case Contingency</b>            | <b>Unit Outage</b> |
|----------------------------------|----------------|-------------------------|--|--------------------|
| Morehead East-<br>Morehead 69 kV | LGEE           | 153.1%                  | Rodburn-Sharkey<br>Tap 138 kV            | Brown #3           |
| Hitchins-Leon 69 kV              | AEP            | 120.0%                  | Goddard KU-<br>Rodburn 138 kV            | Brown #3           |
| Goddard KU-<br>Rodburn 138 kV    | LGEE           | 117.5%                  | Spurlock-Avon 345<br>kV                  | Brown #3           |
| Goddard-Plummers<br>Jct. 69 kV   | EKPC           | 110.6%                  | Goddard KU-<br>Rodburn 138 kV            | Brown #3           |
| Morehead-Morehead<br>West 69 kV  | LGEE           | 108.9%                  | Rodburn-Sharkey<br>Tap 138 kV            | Brown #3           |
| Rodburn-Morehead<br>East 69 kV   | LGEE           | 104.0%                  | Rodburn-Sharkey<br>Tap 138 kV            | Brown #3           |
| Thelma 138-69 kV                 | AEP            | 101.6%                  | Rodburn-Rowan<br>County-Skaggs 138<br>kV | Brown #3           |
| Davis-Nicholasville<br>69 kV     | EKPC           | 101.2%                  | Avon-Loudon<br>Avenue 138 kV             | Brown #3           |

With Cranston-Rowan County Project:

| <b>Limiting Facility</b>     | <b>Company</b> | <b>Percent Overload</b> | <b>Worst-Case Contingency</b> | <b>Unit Outage</b> |
|------------------------------|----------------|-------------------------|-------------------------------|--------------------|
| Morehead East-Morehead 69 kV | LGEE           | 166.3%                  | Rodburn-Sharkey Tap 138 kV    | Brown #3           |
| Morehead-Morehead West 69 kV | LGEE           | 119.7%                  | Rodburn-Sharkey Tap 138 kV    | Brown #3           |
| Rodburn-Morehead East 69 kV  | LGEE           | 112.3%                  | Rodburn-Sharkey Tap 138 kV    | Brown #3           |
| Hitchins-Leon 69 kV          | AEP            | 111.9%                  | Argentum-Low Gap Tap 69 kV    | Brown #3           |
| Davis-Nicholasville 69 kV    | EKPC           | 101.2%                  | Avon-Loudon Avenue 138 kV     | Brown #3           |
| Thelma 138-69 kV             | AEP            | 100.7%                  | Rowan County-Skaggs 138 kV    | Brown #3           |
| Rodburn 138-69 kV            | LGEE           | 100.3%                  | Rodburn-Sharkey Tap 138 kV    | Brown #3           |

**2007 Summer**

Without Cranston-Rowan County Project:

| <b>Limiting Facility</b>       | <b>Company</b> | <b>Percent Overload</b> | <b>Worst-Case Contingency</b>      | <b>Unit Outage</b> |
|--------------------------------|----------------|-------------------------|------------------------------------|--------------------|
| Hitchins-Leon 69 kV            | AEP            | 120.2%                  | Argentum-Low Gap Tap 69 kV         | Brown #3           |
| Goddard KU-Rodburn 138 kV      | LGEE           | 117.8%                  | Spurlock-North Clark 345 kV        | Brown #3           |
| Morehead East-Morehead 69 kV   | LGEE           | 115.0%                  | Rodburn-Sharkey Tap 138 kV         | Brown #3           |
| Goddard-Plummers Jct. 69 kV    | EKPC           | 104.1%                  | Goddard KU-Rodburn 138 kV          | Brown #3           |
| Dale-Three Forks Jct. 138 kV   | EKPC           | 103.2%                  | JK Smith-Union City 138 kV         | Brown #3           |
| Three Forks Jct.-Fawkes 138 kV | EKPC           | 100.1%                  | JK Smith-Union City 138 kV         | Brown #3           |
| Thelma 138-69 kV               | AEP            | 100.1%                  | Rodburn-Rowan County-Skaggs 138 kV | Brown #3           |

With Cranston-Rowan County Project:

| <b>Limiting Facility</b>         | <b>Company</b> | <b>Percent Overload</b> | <b>Worst-Case Contingency</b> | <b>Unit Outage</b> |
|----------------------------------|----------------|-------------------------|-------------------------------|--------------------|
| Morehead East-<br>Morehead 69 kV | LGEE           | 127.5%                  | Rodburn-Sharkey<br>Tap 138 kV | Brown #3           |
| Hitchins-Leon 69 kV              | AEP            | 112.9%                  | Argentum-Low Gap<br>Tap 69 kV | Brown #3           |
| Dale-Three Forks Jct.<br>138 kV  | EKPC           | 102.2%                  | JK Smith-Union City<br>138 kV | Brown #3           |

**2008 Summer**

Without Cranston-Rowan County Project:

| <b>Limiting Facility</b>           | <b>Company</b> | <b>Percent Overload</b> | <b>Worst-Case Contingency</b>            | <b>Unit Outage</b> |
|------------------------------------|----------------|-------------------------|--|--------------------|
| Goddard KU-<br>Rodburn 138 kV      | LGEE           | 123.9%                  | Spurlock-North Clark<br>345 kV           | Brown #3           |
| Hitchins-Leon 69 kV                | AEP            | 123.1%                  | Argentum-Low Gap<br>Tap 69 kV            | Brown #3           |
| Morehead East-<br>Morehead 69 kV   | LGEE           | 121.9%                  | Rodburn-Sharkey<br>Tap 138 kV            | Brown #3           |
| Dale-Three Forks Jct.<br>138 kV    | EKPC           | 111.5%                  | JK Smith-Union City<br>138 kV            | Brown #3           |
| Three Forks Jct.-<br>Fawkes 138 kV | EKPC           | 109.1%                  | JK Smith-Union City<br>138 kV            | Brown #3           |
| Goddard-Plummers<br>Jct. 69 kV     | EKPC           | 108.6%                  | Goddard KU-<br>Rodburn 138 kV            | Brown #3           |
| JK Smith-Union City<br>138 kV      | EKPC           | 103.0%                  | JK Smith-Fawkes<br>138 kV                | Brown #3           |
| Union City-Lake<br>Reba Tap 138 kV | EKPC           | 102.1%                  | JK Smith-Fawkes<br>138 kV                | Brown #3           |
| Thelma 138-69 kV                   | AEP            | 101.7%                  | Rodburn-Rowan<br>County-Skaggs 138<br>kV | Brown #3           |
| Paris CMC Tap 69<br>kV             | LGEE           | 101.7%                  | Avon-Loudon<br>Avenue 138 kV             | Brown #3           |

With Cranston-Rowan County Project:

| <b>Limiting Facility</b>           | <b>Company</b> | <b>Percent Overload</b> | <b>Worst-Case Contingency</b>  | <b>Unit Outage</b> |
|------------------------------------|----------------|-------------------------|--------------------------------|--------------------|
| Morehead East-<br>Morehead 69 kV   | LGEE           | 135.0%                  | Rodburn-Sharkey<br>Tap 138 kV  | Brown #3           |
| Hitchins-Leon 69 kV                | AEP            | 115.0%                  | Argentum-Low Gap<br>Tap 69 kV  | Brown #3           |
| Dale-Three Forks Jct.<br>138 kV    | EKPC           | 110.6%                  | JK Smith-Union City<br>138 kV  | Brown #3           |
| Three Forks Jct.-<br>Fawkes 138 kV | EKPC           | 108.2%                  | JK Smith-Union City<br>138 kV  | Brown #3           |
| JK Smith-Union City<br>138 kV      | EKPC           | 102.4%                  | JK Smith-Fawkes<br>138 kV      | Brown #3           |
| Paris CMC Tap 69<br>kV             | LGEE           | 101.7%                  | Avon-Loudon<br>Avenue 138 kV   | Brown #3           |
| Union City-Lake<br>Reba Tap 138 kV | EKPC           | 101.5%                  | JK Smith-Fawkes<br>138 kV      | Brown #3           |
| Thelma 138-69 kV                   | AEP            | 100.9%                  | Rowan County-<br>Skaggs 138 kV | Brown #3           |



EAST KENTUCKY POWER COOPERATIVE, INC.

PSC CASE NO. 2005-00458

INFORMATION REQUEST RESPONSE

COMMISSION STAFF'S 1ST DATA REQUEST DATED 1-20-06

ITEM 31

RESPONSIBLE PARTY: DARRIN ADAMS

**REQUEST:** Identify the limiting facilities, together with the percentage overload and the outaged facility, that would necessitate re-dispatching Smith Station and Spurlock Station, after the Avon-Boonesboro North Tap upgrade is completed, for the following conditions in each of the winters of 2005-2006, 2006-2007, and 2007-2008:

- a. Winter normal conditions without north-south transfers.
- b. Winter normal conditions with north-south transfers.
- c. Winter single contingency outage without north-south transfers.
- d. Winter single contingency outage with north-south transfers.
- e. Winter single contingency plus unit outage without north-south transfers.
- f. Winter single contingency plus unit outage with north-south transfers.

**RESPONSE:** The limiting facilities for the conditions described above were identified through power flow analysis using EKPC's latest models. A north-south transfer level of 4000 MW was simulated to develop the responses to b), d), and f). Power flows were performed both with and without the proposed Cranston-Rowan County 138 kV Project to illustrate the impact of the line addition. Only the worst-case overloading is shown for

each limiting facility. In many cases, a limiting facility may overload for several different contingencies.

**g) Normal conditions without north-south transfers**

**2005-06 Winter**

Without Cranston-Rowan County Project:

| <b>Limiting Facility</b>  | <b>Company</b> | <b>Percent Overload</b> | <b>Worst-Case Contingency</b> |
|---------------------------|----------------|-------------------------|-------------------------------|
| Goddard KU-Rodburn 138 kV | LGEE           | 129.5%                  | None                          |

With Cranston-Rowan County Project:

| <b>Limiting Facility</b> | <b>Company</b> | <b>Percent Overload</b> | <b>Worst-Case Contingency</b> |
|--------------------------|----------------|-------------------------|-------------------------------|
| None                     |                |                         |                               |

**2006-07 Winter**

Without Cranston-Rowan County Project:

| <b>Limiting Facility</b>  | <b>Company</b> | <b>Percent Overload</b> | <b>Worst-Case Contingency</b> |
|---------------------------|----------------|-------------------------|-------------------------------|
| Goddard KU-Rodburn 138 kV | LGEE           | 127.8%                  | None                          |

With Cranston-Rowan County Project:

| <b>Limiting Facility</b> | <b>Company</b> | <b>Percent Overload</b> | <b>Worst-Case Contingency</b> |
|--------------------------|----------------|-------------------------|-------------------------------|
| None                     |                |                         |                               |

**2007-08 Winter**

Without Cranston-Rowan County Project:

| <b>Limiting Facility</b>  | <b>Company</b> | <b>Percent Overload</b> | <b>Worst-Case Contingency</b> |
|---------------------------|----------------|-------------------------|-------------------------------|
| Goddard KU-Rodburn 138 kV | LGEE           | 120.1%                  | None                          |

With Cranston-Rowan County Project:

| <b>Limiting Facility</b> | <b>Company</b> | <b>Percent Overload</b> | <b>Worst-Case Contingency</b> |
|--------------------------|----------------|-------------------------|-------------------------------|
| None                     |                |                         |                               |

**h) Normal conditions with a 4000 MW incremental north-south transfer**

**2005-06 Winter**

Without Cranston-Rowan County Project:

| <b>Limiting Facility</b>  | <b>Company</b> | <b>Percent Overload</b> | <b>Worst-Case Contingency</b> |
|---------------------------|----------------|-------------------------|-------------------------------|
| Goddard KU-Rodburn 138 kV | LGEE           | 138.8%                  | None                          |
| Avon 345-138 kV           | EKPC           | 101.9%                  | None                          |

With Cranston-Rowan County Project:

| <b>Limiting Facility</b> | <b>Company</b> | <b>Percent Overload</b> | <b>Worst-Case Contingency</b> |
|--------------------------|----------------|-------------------------|-------------------------------|
| Avon 345-138 kV          | EKPC           | 101.2%                  | None                          |

**2006-07 Winter**

Without Cranston-Rowan County Project:

| <b>Limiting Facility</b>  | <b>Company</b> | <b>Percent Overload</b> | <b>Worst-Case Contingency</b> |
|---------------------------|----------------|-------------------------|-------------------------------|
| Goddard KU-Rodburn 138 kV | LGEE           | 137.0%                  | None                          |

With Cranston-Rowan County Project:

| <b>Limiting Facility</b> | <b>Company</b> | <b>Percent Overload</b> | <b>Worst-Case Contingency</b> |
|--------------------------|----------------|-------------------------|-------------------------------|
| None                     |                |                         |                               |

**2006-07 Winter**

Without Cranston-Rowan County Project:

| <b>Limiting Facility</b>  | <b>Company</b> | <b>Percent Overload</b> | <b>Worst-Case Contingency</b> |
|---------------------------|----------------|-------------------------|-------------------------------|
| Goddard KU-Rodburn 138 kV | LGEE           | 125.8%                  | None                          |

With Cranston-Rowan County Project:

| <b>Limiting Facility</b> | <b>Company</b> | <b>Percent Overload</b> | <b>Worst-Case Contingency</b> |
|--------------------------|----------------|-------------------------|-------------------------------|
| None                     |                |                         |                               |

**i) Single contingency outage without north-south transfers**

**2005-06 Winter**

Without Cranston-Rowan County Project:

| <b>Limiting Facility</b>  | <b>Company</b> | <b>Percent Overload</b> | <b>Worst-Case Contingency</b>     |
|---------------------------|----------------|-------------------------|-----------------------------------|
| Goddard KU-Rodburn 138 kV | LGEE           | 106.4%                  | Avon-Boonesboro North-Dale 138 kV |

With Cranston-Rowan County Project:

| <b>Limiting Facility</b> | <b>Company</b> | <b>Percent Overload</b> | <b>Worst-Case Contingency</b> |
|--------------------------|----------------|-------------------------|-------------------------------|
| Rodburn 138-69 kV        | LGEE           | 101.4%                  | Rodburn-Sharkey Tap 138 kV    |

**2006-07 Winter**

Without Cranston-Rowan County Project:

| <b>Limiting Facility</b>  | <b>Company</b> | <b>Percent Overload</b> | <b>Worst-Case Contingency</b> |
|---------------------------|----------------|-------------------------|-------------------------------|
| Goddard KU-Rodburn 138 kV | LGEE           | 104.6%                  | Goddard 138-69 kV             |

With Cranston-Rowan County Project:

| <b>Limiting Facility</b> | <b>Company</b> | <b>Percent Overload</b> | <b>Worst-Case Contingency</b> |
|--------------------------|----------------|-------------------------|-------------------------------|
| Rodburn 138-69 kV        | LGEE           | 101.1%                  | Rodburn-Sharkey Tap 138 kV    |

**2007-08 Winter**

Without Cranston-Rowan County Project:

| <b>Limiting Facility</b>  | <b>Company</b> | <b>Percent Overload</b> | <b>Worst-Case Contingency</b> |
|---------------------------|----------------|-------------------------|-------------------------------|
| Goddard KU-Rodburn 138 kV | LGEE           | 103.3%                  | Spurlock-North Clark 345 kV   |

With Cranston-Rowan County Project:

| <b>Limiting Facility</b> | <b>Company</b> | <b>Percent Overload</b> | <b>Worst-Case Contingency</b> |
|--------------------------|----------------|-------------------------|-------------------------------|
| None                     |                |                         |                               |

**j) Single contingency outage with a 4000 MW incremental north-south transfer**

**2005-06 Winter**

Without Cranston-Rowan County Project:

| <b>Limiting Facility</b>     | <b>Company</b> | <b>Percent Overload</b> | <b>Worst-Case Contingency</b>     |
|------------------------------|----------------|-------------------------|-----------------------------------|
| Goddard KU-Rodburn 138 kV    | LGEE           | 115.1%                  | Spurlock-Avon 345 kV              |
| Fayette-Davis 69 kV          | EKPC           | 102.8%                  | Avon-Loudon Avenue 138 kV         |
| Winchester-Parker Seal 69 kV | LGEE           | 102.6%                  | Boonesboro North-Dale 138 kV      |
| Davis-Nicholasville 69 kV    | EKPC           | 102.1%                  | Avon-Loudon Avenue 138 kV         |
| Avon-Loudon Avenue 138 kV    | EKPC-LGEE      | 101.5%                  | Avon-Boonesboro North-Dale 138 kV |

With Cranston-Rowan County Project:

| <b>Limiting Facility</b>  | <b>Company</b> | <b>Percent Overload</b> | <b>Worst-Case Contingency</b>     |
|---------------------------|----------------|-------------------------|-----------------------------------|
| Rodburn 138-69 kV         | LGEE           | 108.3%                  | Rodburn-Sharkey Tap 138 kV        |
| Fayette-Davis 69 kV       | EKPC           | 103.1%                  | Avon-Loudon Avenue 138 kV         |
| Davis-Nicholasville 69 kV | EKPC           | 102.4%                  | Avon-Loudon Avenue 138 kV         |
| Avon-Loudon Avenue 138 kV | EKPC-LGEE      | 100.9%                  | Avon-Boonesboro North-Dale 138 kV |

**2006-07 Winter**

Without Cranston-Rowan County Project:

| <b>Limiting Facility</b>  | <b>Company</b> | <b>Percent Overload</b> | <b>Worst-Case Contingency</b> |
|---------------------------|----------------|-------------------------|-------------------------------|
| Goddard KU-Rodburn 138 kV | LGEE           | 113.2%                  | Spurlock-Avon 345 kV          |

With Cranston-Rowan County Project:

| <b>Limiting Facility</b> | <b>Company</b> | <b>Percent Overload</b> | <b>Worst-Case Contingency</b> |
|--------------------------|----------------|-------------------------|-------------------------------|
| Rodburn 138-69 kV        | LGEE           | 107.9%                  | Rodburn-Sharkey Tap 138 kV    |

**2007-08 Winter**

Without Cranston-Rowan County Project:

| <b>Limiting Facility</b>  | <b>Company</b> | <b>Percent Overload</b> | <b>Worst-Case Contingency</b> |
|---------------------------|----------------|-------------------------|-------------------------------|
| Goddard KU-Rodburn 138 kV | LGEE           | 112.0%                  | Spurlock-North Clark 345 kV   |

With Cranston-Rowan County Project:

| <b>Limiting Facility</b> | <b>Company</b> | <b>Percent Overload</b> | <b>Worst-Case Contingency</b> |
|--------------------------|----------------|-------------------------|-------------------------------|
| None                     |                |                         |                               |

**k) Single contingency plus unit outage without north-south transfers**

**2005-06 Winter**

Without Cranston-Rowan County Project:

| <b>Limiting Facility</b>   | <b>Company</b> | <b>Percent Overload</b> | <b>Worst-Case Contingency</b> | <b>Unit Outage</b> |
|----------------------------|----------------|-------------------------|-------------------------------|--------------------|
| Goddard KU-Rodburn 138 kV  | LGEE           | 108.9%                  | Spurlock-Avon 345 kV          | Brown #3           |
| Fayette-Davis 69 kV        | EKPC           | 101.6%                  | Avon-Loudon Avenue 138 kV     | Brown #3           |
| Loudon Avenue 138-69 kV #1 | LGEE           | 100.6%                  | Loudon Avenue 138-69 kV #2    | Brown #3           |
| Davis-Nicholasville 69 kV  | EKPC           | 100.3%                  | Avon-Loudon Avenue 138 kV     | Brown #3           |

With Cranston-Rowan County Project:

| Limiting Facility          | Company | Percent Overload | Worst-Case Contingency     | Unit Outage |
|----------------------------|---------|------------------|----------------------------|-------------|
| Rodburn 138-69 kV          | LGEE    | 104.2%           | Rodburn-Sharkey Tap 138 kV | Brown #3    |
| Fayette-Davis 69 kV        | EKPC    | 101.7%           | Avon-Loudon Avenue 138 kV  | Brown #3    |
| Davis-Nicholasville 69 kV  | EKPC    | 100.5%           | Avon-Loudon Avenue 138 kV  | Brown #3    |
| Loudon Avenue 138-69 kV #1 | LGEE    | 100.3%           | Loudon Avenue 138-69 kV #2 | Brown #3    |

**2006-07 Winter**

Without Cranston-Rowan County Project:

| Limiting Facility         | Company | Percent Overload | Worst-Case Contingency | Unit Outage |
|---------------------------|---------|------------------|------------------------|-------------|
| Goddard KU-Rodburn 138 kV | LGEE    | 107.3%           | Goddard 138-69 kV      | Brown #3    |

With Cranston-Rowan County Project:

| Limiting Facility | Company | Percent Overload | Worst-Case Contingency     | Unit Outage |
|-------------------|---------|------------------|----------------------------|-------------|
| Rodburn 138-69 kV | LGEE    | 103.9%           | Rodburn-Sharkey Tap 138 kV | Brown #3    |

**2007-08 Winter**

Without Cranston-Rowan County Project:

| Limiting Facility         | Company | Percent Overload | Worst-Case Contingency      | Unit Outage |
|---------------------------|---------|------------------|-----------------------------|-------------|
| Goddard KU-Rodburn 138 kV | LGEE    | 106.9%           | Spurlock-North Clark 345 kV | Brown #3    |

With Cranston-Rowan County Project:

| Limiting Facility | Company | Percent Overload | Worst-Case Contingency | Unit Outage |
|-------------------|---------|------------------|------------------------|-------------|
| None              |         |                  |                        |             |

**l) Single contingency plus unit outage with a 4000 MW incremental north-south transfer**

**2005-06 Winter**

Without Cranston-Rowan County Project:

| <b>Limiting Facility</b>       | <b>Company</b> | <b>Percent Overload</b> | <b>Worst-Case Contingency</b>     | <b>Unit Outage</b> |
|--------------------------------|----------------|-------------------------|-----------------------------------|--------------------|
| Fayette-Davis 69 kV            | EKPC           | 118.7%                  | Avon-Loudon Avenue 138 kV         | Brown #3           |
| Davis-Nicholasville 69 kV      | EKPC           | 118.4%                  | Avon-Loudon Avenue 138 kV         | Brown #3           |
| Goddard KU-Rodburn 138 kV      | LGEE           | 117.7%                  | Spurlock-Avon 345 kV              | Brown #3           |
| Avon-Loudon Avenue 138 kV      | EKPC-LGEE      | 114.0%                  | Avon-Boonesboro North-Dale 138 kV | Brown #3           |
| Loudon Avenue 138-69 kV #1     | LGEE           | 104.7%                  | Loudon Avenue 138-69 kV #2        | Brown #3           |
| Dale-Three Forks Jct. 138 kV   | EKPC           | 104.2%                  | JK Smith-Union City 138 kV        | Brown #3           |
| Avon 345-138 kV                | EKPC           | 102.3%                  | Baker-Broadford 765 kV            | Brown #3           |
| Goddard-Plummers Jct. 69 kV    | EKPC           | 102.2%                  | Goddard KU-Rodburn 138 kV         | Brown #3           |
| Three Forks Jct.-Fawkes 138 kV | EKPC           | 100.6%                  | JK Smith-Union City 138 kV        | Brown #3           |
| Rodburn 138-69 kV              | LGEE           | 100.1%                  | Rodburn-Sharkey Tap 138 kV        | Brown #3           |

With Cranston-Rowan County Project:

| <b>Limiting Facility</b>        | <b>Company</b> | <b>Percent Overload</b> | <b>Worst-Case Contingency</b>     | <b>Unit Outage</b> |
|---------------------------------|----------------|-------------------------|-----------------------------------|--------------------|
| Fayette-Davis 69 kV             | EKPC           | 118.8%                  | Avon-Loudon Avenue 138 kV         | Brown #3           |
| Davis-Nicholasville 69 kV       | EKPC           | 118.5%                  | Avon-Loudon Avenue 138 kV         | Brown #3           |
| Avon-Loudon Avenue 138 kV       | EKPC-LGEE      | 113.2%                  | Avon-Boonesboro North-Dale 138 kV | Brown #3           |
| Rodburn 138-69 kV               | LGEE           | 111.1%                  | Rodburn-Sharkey Tap 138 kV        | Brown #3           |
| Loudon Avenue 138-69 kV #1      | LGEE           | 104.4%                  | Loudon Avenue 138-69 kV #2        | Brown #3           |
| Spencer Road-AO Smith Tap 69 kV | LGEE           | 103.7%                  | Avon-Boonesboro North-Dale 138 kV | Brown #3           |
| Dale-Three Forks Jct. 138 kV    | EKPC           | 103.5%                  | JK Smith-Union City 138 kV        | Brown #3           |
| Avon 345-138 kV                 | EKPC           | 101.6%                  | Baker-Broadford 765 kV            | Brown #3           |

**2006-07 Winter**

Without Cranston-Rowan County Project:

| <b>Limiting Facility</b>    | <b>Company</b> | <b>Percent Overload</b> | <b>Worst-Case Contingency</b> | <b>Unit Outage</b> |
|-----------------------------|----------------|-------------------------|-------------------------------|--------------------|
| Goddard KU-Rodburn 138 kV   | LGEE           | 115.8%                  | Spurlock-Avon 345 kV          | Brown #3           |
| Goddard-Plummers Jct. 69 kV | EKPC           | 101.3%                  | Goddard KU-Rodburn 138 kV     | Brown #3           |

With Cranston-Rowan County Project:

| <b>Limiting Facility</b>        | <b>Company</b> | <b>Percent Overload</b> | <b>Worst-Case Contingency</b>     | <b>Unit Outage</b> |
|---------------------------------|----------------|-------------------------|-----------------------------------|--------------------|
| Rodburn 138-69 kV               | LGEE           | 110.7%                  | Rodburn-Sharkey Tap 138 kV        | Brown #3           |
| Spencer Road-AO Smith Tap 69 kV | LGEE           | 102.0%                  | Avon-Boonesboro North-Dale 138 kV | Brown #3           |